Accomplishments of the Matériaux en Interaction et Réflexion Toutes Epaisseurs (MIRTE) Program During 2010

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Outline

1. A short history of the MIRTE Program
3. Description of the MIRTE 1 Program
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9. U.S. Beneficiaries

Short History of the MIRTE Program

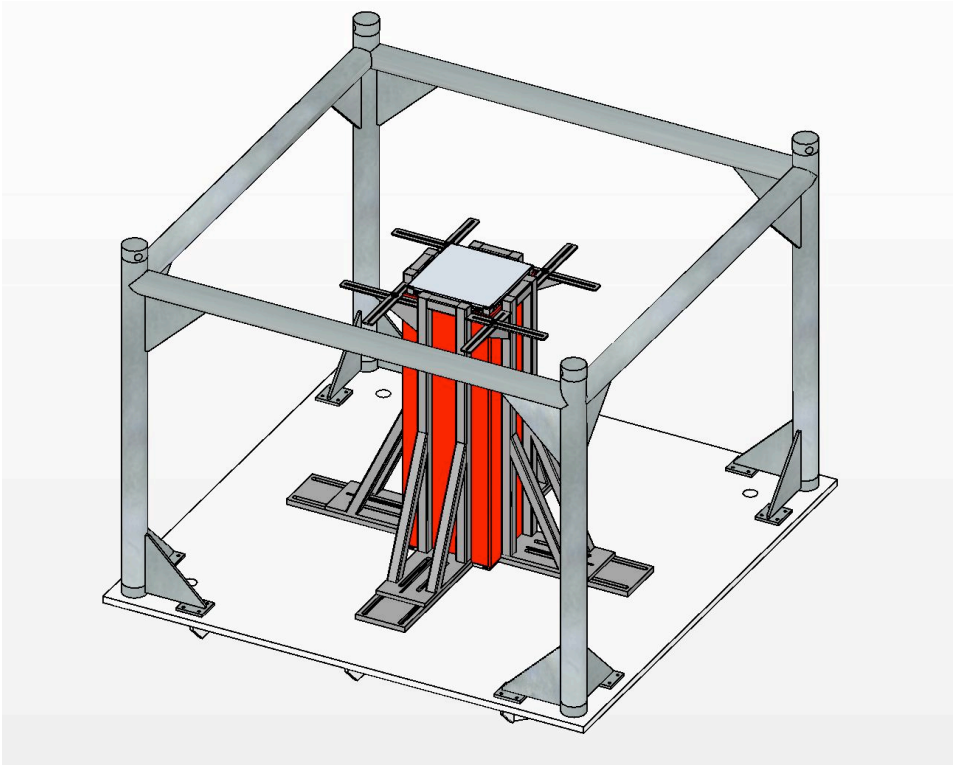
1. A Program to test reactivity effects of several structural/reflector materials that are important to criticality safety was initiated by the Institut de Radioprotection et de Sûreté Nucléaire (IRSN) in 2005
2. The Program evolved into an international collaboration in 2007
   - IRSN
   - French energy group AREVA
   - French National Radioactive Waste Management Agency ANDRA
   - United States Department of Energy (DOE)
3. The experiments were carried out in the Apparatus B assembly at the Valduc facility from December 2008 to June 2010,
4. The experiments involved water-moderated low-enriched UO_2 rod lattices in thermal energy spectra separated or reflected by different structural material plates: iron, nickel, copper, aluminum, zircalloy, lead, glass (SiO2), titanium, and concrete with different water contents.

MIRTE – 1

- Reflected Configurations
- Interacting Arrays (2) Separated by Large Absorbing Screens
- Interacting Arrays (2) Separated by Large Concrete Screens
- Interacting Arrays (4) Separated by Thin Absorbing Plates

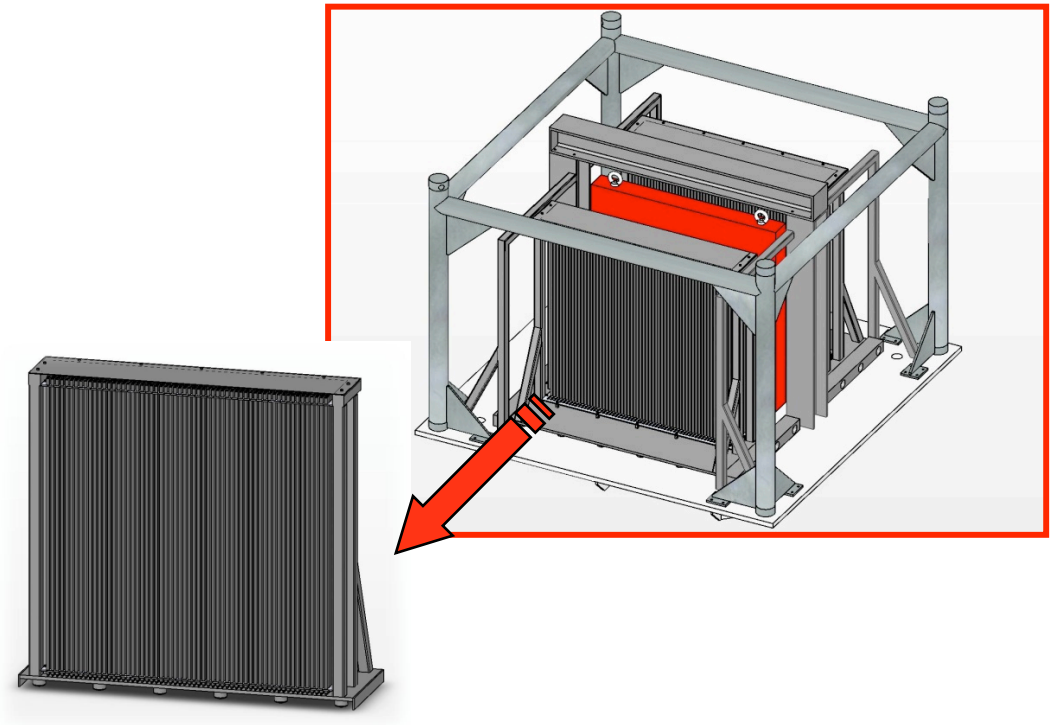
Reflected Configurations (3 Exp. – 1 Ref.)

Material	Thickness (cm)
Aluminum	5
	20
SiO_2	20
Water	20



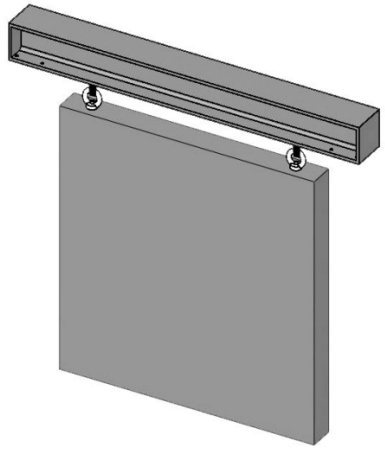
Interacting Configurations with Large Absorbing Screens (7 Exp. – 4 Ref.)

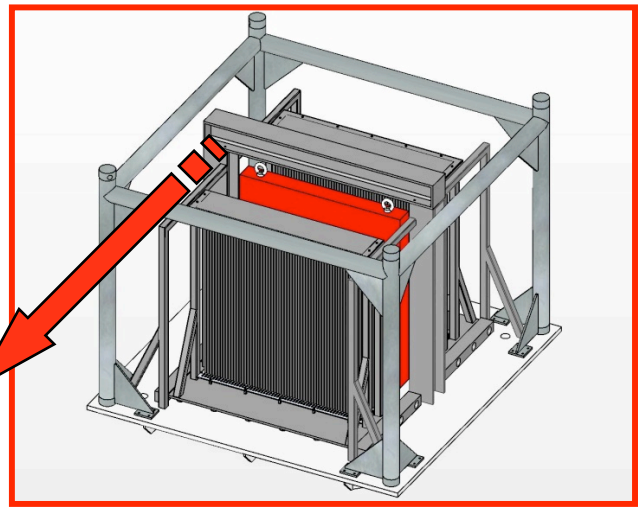
Material	Thickness (cm)
Aluminum	30
Copper	5
Iron	20
Nickel	20
Lead	5
	20
Zircalloy	10
Water	5
	10
Air (Empty Aluminum box)	20



Interacting Configurations with Large Concrete Absorbing Screens (3 Exp.)

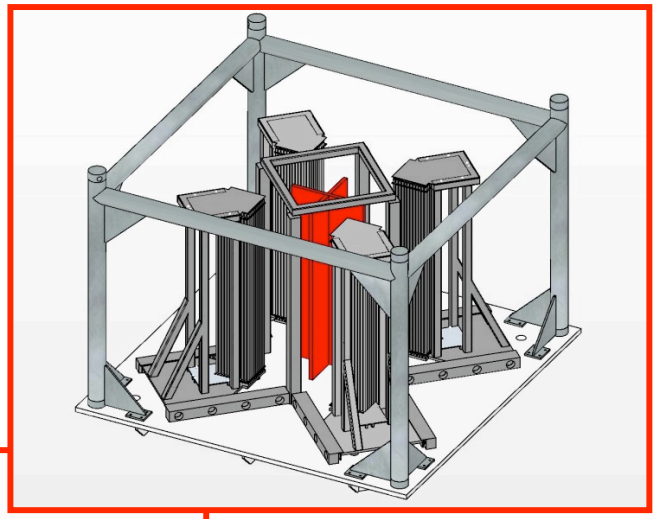
Concrete water content	Screen thickness (cm)
3%	30
6%	30
9%	30

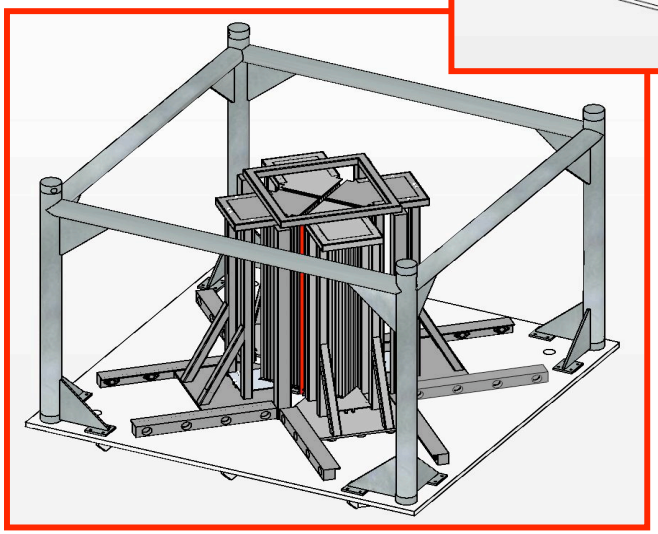


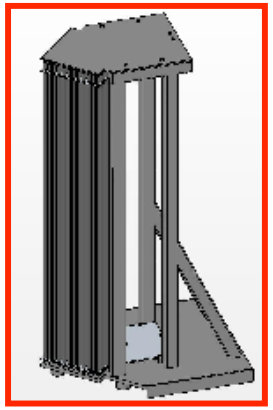


Interacting Configurations with Thin Absorbing Plates (6 Exp. – 4 Ref.)

Material	Thickness (cm)
Copper	0.5
Iron	0.3
	2
Nickel	0.3
Titanium	0.5
	1
Water	0.3
	0.5
	1
	2







MIRTE – 2

- MIRTE-2.1
  - MIRTE Feedback
  - Improve Accuracy of Experimental Program
  - 2011
- MIRTE-2.2
  - Experiments with New Materials (Cr, Mn, Mo, Cl, Rh)
  - No Modification of the Experimental Device
  - 2012
- MIRTE-2.3
  - New Experiments Requiring Small Modification to Experimental Device
  - 2013 (*if required*)
- Apparatus B Refurbishment to begin in 2014

Availability of Data

- Titanium data will be published in the 2011 Edition of the ICSBEP Handbook

- All other data are classified as proprietary and will not be made available for publication until 31 December 2017

- All proprietary data may be made available to designated Beneficiaries via non-disclosure agreements after proprietary reviews are completed and documents are finalized

US Beneficiaries

U.S. DOE Management and Oversight (M&O) Contactors at:

- Idaho National Laboratory (INL)
- Los Alamos National Laboratory (INL)
- Lawrence Livermore National Laboratory (LLNL)
- Argonne National Laboratory (ANL)
- Oak Ridge National Laboratory (ORNL)
- Oak Ridge Y-12 Plant
- Sandia National Laboratory (SNL)
- Brookhaven National Laboratory (BNL)
- Savannah River National Laboratory (SRNL)
- Bettis Laboratory (BL)
- Knolls Atomic Power Laboratory (KAPL)
- Pacific Northwest National Laboratory (PNNL)
- Yucca Mountain
- Hanford Reservation
- Pantex
- Nevada Test Site

US Beneficiaries (Continued)

Idaho National Laboratory Subcontractors:

- Washington Safety Management Solutions (WSMS)
- Nichole Ellis
- Virginia Dean
- Lori Scott

U.S. Department of Energy Subcontractors:

- Scientific Associates International Company (SAIC)
- Fluor Government Group

U.S. Nuclear Regulatory Commission (NRC)